

ARMENIAN EVANGELICAL CENTRAL HIGH SCHOOL

MATH Grade 11H (2015 - 2016)

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Objectives for the academic year for each topic

**I. Functions**

- 1) Define a function.
- 2) Determine the domain of definition of a function.
- 3) Distinguish between odd and even functions.
- 4) Determine the axial or central symmetry of a function starting at the definition.
- 5) Draw the graph of functions representatives of a parabola and a hyperbola.
- 6) Compare two functions graphically.

**II. Economic function**

- 1) Define the terms of economic functions as total cost, average cost, marginal cost, revenue and profit.
- 2) Compare demand and supply functions.

**III. Second degree equations**

- 1) Find the discriminant of a second degree equation.
- 2) Use the discriminant to determine the existence and number of roots.
- 3) Solve a second degree equation.
- 4) Find the sum and product of the roots.
- 5) Find two numbers when the sum and product are given.
- 6) Apply finding the roots to the economic functions.

**IV. Sign of second degree equation**

- 1) Determine the sign of a trinomial according to the intervals determined by the roots.
- 2) Solve inequalities and systems of inequalities.
- 3) Apply the sign of the roots to find the interval of profit in the economic functions.
- 4) Distinguish between positive and negative profit.

## V. **Limits of functions**

- 1) Calculate the limit of a function at infinity.
- 2) Deduce the existence and equation of a horizontal asymptote.
- 3) Calculate the limit of a function at a point.
- 4) Deduce the existence and equation of a vertical asymptote.
- 5) Apply the theory of limits to the economic functions.

## VI. **Derivatives**

- 1) Memorize the formulas to find derivatives.
- 2) Find the derivatives of functions by using the formulas.
- 3) Determine the sense of variation of a function according to the sign of the derivative.
- 4) Find the marginal cost by taking the derivative of the total cost.
- 5) Recognize the relation between marginal cost and derivative.

## VII. **Polynomial functions**

- 1) Determine the domain of definition of a polynomial function.
- 2) Find the limits at the open bounds.
- 3) Prove axial symmetry if it exists.
- 4) Calculate the derivative and study its sign.
- 5) Make a table of variation.
- 6) Make a particular values table.
- 7) Draw the graph in an orthonormal system of axes.
- 8) Study the variations and plot the graph of economic functions in an orthogonal system of axes.

## VIII. **Rational functions**

- 1) Determine the domain of definition of a rational function.
- 2) Find the limits at the open bounds, deduce the asymptotes.
- 3) Find the equation of the oblique asymptote and justify.
- 4) Prove central symmetry if it exists.
- 5) Calculate the derivative and study its sign.
- 6) Make a table of variation and a particular values table.
- 7) Draw the graph in an orthonormal system of axes.
- 8) Study the variations and plot the graph of economic functions in an orthogonal system of axes.

**IX. Antiderivatives**

- 1) Find the antiderivative of a polynomial function.
- 2) Recognize that the antiderivative of the marginal cost is the total cost.
- 3) Find the antiderivatives of economic functions which satisfy a given condition.

**X. Sequences**

- 1) Recognize an arithmetic sequence.
- 2) Calculate the  $n^{\text{th}}$  term and sum of terms of an arithmetic sequence.
- 3) Recognize a geometric sequence.
- 4) Calculate the  $n^{\text{th}}$  term and sum of terms of a geometric sequences.
- 5) Use the arithmetic mean and the geometric mean to solve problems.
- 6) Apply the arithmetic sequence to find an acquired amount by simple interest.
- 7) Apply geometric sequence to find an acquired amount by compound interest.

**XI. Statistics**

- 1) Arrange a statistical data in classes of equal amplitude.
- 2) Find the center of a class.
- 3) Calculate relative, increasing and decreasing frequencies.
- 4) Make a histogram and polygon.
- 5) Read data given in a histogram.

**XII. Probability**

- 1) Perform operations by using factorials of numbers.
- 2) Count the possible outcomes of an experiment.
- 3) Differentiate between p-list, permutation and arrangement.
- 4) Memorize the formulas for counting.
- 5) Define probability, event, certain and impossible event.
- 6) Define compatible and incompatible events.
- 7) Define complementary event.
- 8) Calculate the probabilities of given events.